ONTARIO MINISTRY OF ENVIRONMENT
36936000024465

1966 OPERATING SUMMARY

PRESTON

water pollution control plant

TD
367
.A56
P748
1966
MOE

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

TD
367
.A56
P748
1966

Preston : water pollution control
plant.
81796

ONTARIO WATER RESOURCES COMMISSION
OFFICE OF THE GENERAL MANAGER

Members of the Preston Local Advisory Committee,
Preston, Ontario.

Gentlemen:

We are pleased to submit to you the 1966 Operating Summary for the Preston Water Pollution Control Plant, OWRC Project No. 59-S-46.

It is hoped that our joint participation in efforts to combat water pollution will have even more success in the coming year.

Yours very truly,

D. S. Caverly,
General Manager.

LIBRARY COPY
NOV 23 1967
ONTARIO WATER
RESOURCES COMMISSION

ONTARIO WATER RESOURCES COMMISSION
801 BAY STREET
TORONTO 5

J. A. VANCE, LL.D.
CHAIRMAN
J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER
W. S. MacDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am happy to present you with the 1966 Operating Summary for the Preston Water Pollution Control Plant, OWRC Project No. 59-S-46.

The report offers a concise summary of operating data for the year and comparisons with previous years where these are applicable and significant.

Yours very truly,

B C Palmer

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

FOREWORD

● This operating summary contains complete information on the management of the project during 1966. It contains a concise review of the year's plant operation, significant financial details, and a visual presentation in graphs and charts of technical performance.

The information will be of value to interested parties in assessing the adequacy of the project at this time and its ability to meet future requirements.

The report is the result of co-operation by several groups within the Division of Plant Operations. These include the statistics section and the technical publications section. The Division of Finance and the draughting section of the Division of Sanitary Engineering were also closely associated with its publication.

The Regional Operations Engineer, however, has had the primary responsibility for the content, and will be happy to answer any questions regarding it.

CONTENTS

Foreword 1

Title Page 3

'66 Review 5

Project Costs 6

Operating Costs 10

Process Data 13

Conclusions . . . . Inside back cover

PRESTON

water pollution control plant

operated for

THE TOWN OF PRESTON

by the

ONTARIO WATER RESOURCES COMMISSION

CHAIRMAN: Dr. James A. Vance

VICE-CHAIRMAN: J. H. H. Root, M.P.P.

COMMISSIONERS

W. D. Conklin, Q.C.	H. E. Brown
D. A. Moodie	L. E. Venchiarutti

GENERAL MANAGER: D. S. Caverly

ASSISTANT GENERAL MANAGERS

L. E. Owers	K. H. Sharpe
F. A. Voege	A. K. Watt

COMMISSION SECRETARY

W. S. MacDonnell

DIVISION OF PLANT OPERATIONS

DIRECTOR: B. C. Palmer

Assistant Director: C. W. Perry
Regional Supervisor: D. A. McTavish
Operations Engineer: B. W. Hansler

801 Bay Street Toronto 5

Digitized by the Internet Archive
in 2015

https://archive.org/details/prestonwaterpoll24465

'66 REVIEW

The total operating cost for 1966 of the Preston Water Pollution Control Plant increased approximately 19 percent from the previous year. The increase in total costs is due primarily to the increased cost of operation of the vacuum filter, and removal of the dewatered sludge. The high organic loading at the plant made it impractical to operate an aerobic digester, and so a large quantity of waste activated sludge was filtered.

Completion of the effluent process water system in 1966 has reduced the cost of water markedly.

Although the influent BOD and suspended solids concentrations were considerably greater than the design values, the BOD and suspended solids concentrations of the plant effluent were within the objectives of the OWRC. A removal efficiency of 97.5 percent for BOD and 98 percent for suspended solids indicates good plant operation.

PROJECT COSTS

STAGE 1

NET CAPITAL COST (Final) Long Term Debt to OWRC	$147,617.75

Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966	$ 20,878.03

Net Operating	$ -
Debt Retirement	2,979.00
Reserve	800.96
Interest Charged	8,305.30
TOTAL	$ 12,085.26

RESERVE ACCOUNT

Balance at January 1, 1966	$ 5,977.23
Deposited by Municipality	800.96
Interest Earned	348.72
	$ 7,126.91
Less Expenditures	-
Balance at December 31, 1966	$ 7,126.91

STAGE 2

NET CAPITAL COST (Final)	$647,993.44
DEDUCT - Portion Financed by CMHC (Estimated)	432,072.28
Long Term Debt to OWRC	$215,921.16
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966	$ 18,416.72

Net Operating	$ 43,359.79
Debt Retirement	4,357.00
Reserve	4,086.70
Interest Charged	12,148.22
TOTAL	$ 63,951.71

RESERVE ACCOUNT

Balance at January 1, 1966	$ 12,423.30
Deposited by Municipality	4,086.70
Interest Earned	739.92
	$ 17,249.92
Less Expenditures	4,950.29
Balance at December 31, 1966	$ 12,299.63

BILLINGS - BOTH PROJECTS

	STAGE I	STAGE II	TOTAL
Net Operating	-	$43,359.79	$43,359.79
Debt Retirement	$ 2,979.00	4,357.00	7,336.00
Reserve	800.96	4,086.70	4,887.66
Interest Charged	8,305.30	12,148.22	20,453.52
TOTAL	$12,085.26	$63,951.81	$76,036.97

RESERVE ACCOUNT - BOTH PROJECTS

	STAGE I	STAGE II	TOTAL
Balance at Jan. 1, 1966	$5,977.23	$12,423.30	$18,400.53
Deposited by Municipality	800.96	4,086.70	4,887.66
Interest Earned	348.72	739.92	1,088.64
	$7,126.91	$17,249.92	$24,376.83
Less Expenditures	-	4,950.29	4,950.29
Balance at Dec. 31, 1966	$7,126.91	$12,299.63	$19,426.54

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	*SUNDRY	WATER
JAN	1368.31	1304.18			(271.50)		6.40		302.82	26.41	
FEB	3726.95	1209.12		148.50	392.60	1342.60	86.41		185.62	362.10	
MARCH	2805.12	1229.82			658.25		54.45	415.28	28.42	217.01	201.89
APRIL	3666.78	2105.08		119.39	401.45	247.08	218.23		248.79	326.76	
MAY	2708.90	1296.81			384.17	365.95	34.41		64.22	496.78	66.56
JUNE	4122.54	1475.62	216.16	148.50	403.05	501.92	228.90	63.08	(29.59)	1114.90	
JULY	4492.94	1270.70	293.36		375.95	1541.19	80.50		298.85	559.67	72.72
AUG	4929.06	1386.05	293.17		367.80	2578.84	39.49		225.96	37.75	
SEPT	4469.77	1944.15	368.88		404.87	495.92	62.95	350.84	20.00	763.90	58.26
OCT	2715.91	1310.77			382.41		52.64	195.93	49.43	724.73	
NOV	3910.63	1303.46			386.06	1729.22	67.66			367.24	56.99
DEC	4442.88	1303.50		74.25	404.10	1604.67	84.00			918.63	53.73
TOTAL	43359.79	17139.26	1171.57	490.64	4289.21	10407.39	1016.04	1025.13	1394.52	5915.88	510.15

* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE $4,376.70

BRACKETS INDICATE CREDIT

YEARLY OPERATING COSTS

YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR *	COST PER MILLION GALLONS	COST PER LB. OF BOD REMOVED
1963	284.127	$30,651.00	$ 9.91	$108.00	2½ CENTS
1964	284.326	$30,649.67	$ 9.67	$107.80	2½ CENTS
1965	326.714	$36,292.57	$11.47	$111.08	3 CENTS
1966	336.947	$43,359.79	$13.53	$128.68	3 CENTS

* BASED ON ANNUAL POPULATION ESTIMATE AND 3.9 PERSONS PER FAMILY

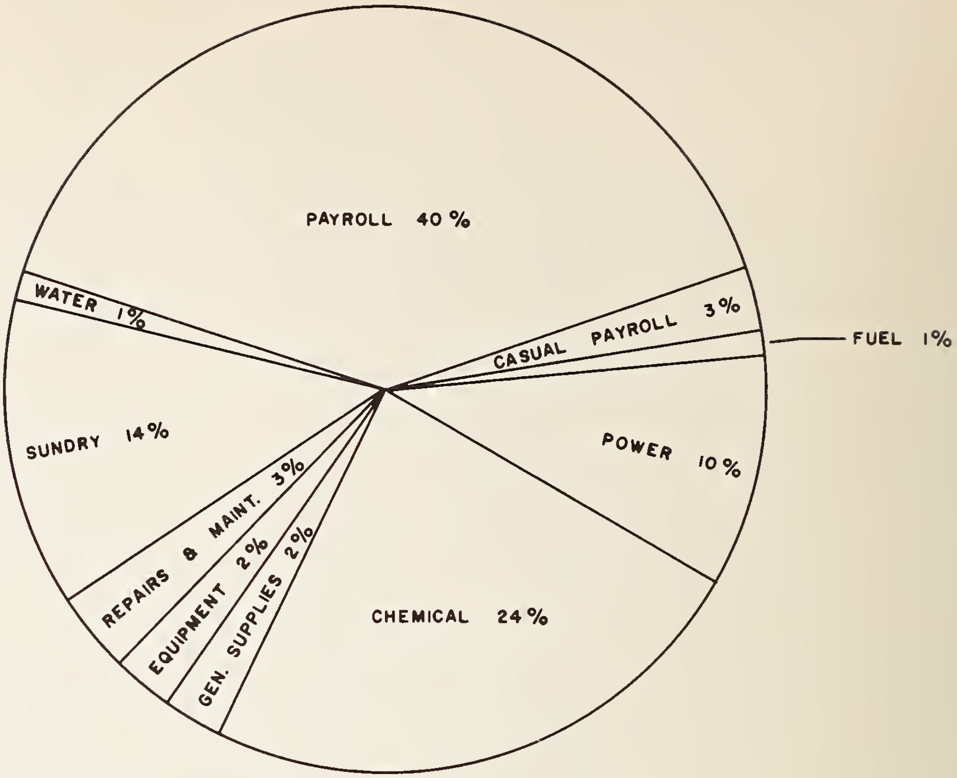
VACUUM FILTER COSTS (MONTHLY)

MONTH	COST PER MONTH					TOTAL	COST PER TON DRY WEIGHT					TOTAL
	$FeCl_3$	LIME	LABOUR	ELEC	MAINT		$FeCl_3$	LIME	LABOUR	ELEC	MAINT	
JANUARY	205.22	167.96	266.46	73.84	21.28	724.76	2.83	2.32	3.68	1.02	0.29	10.14
FEBRUARY	91.28	44.77	147.18	55.99	12.12	351.34	1.66	0.82	2.68	1.02	0.22	6.40
MARCH	156.60	187.38	238.13	61.18	19.12	562.41	2.61	1.46	3.97	1.02	0.32	9.38
APRIL	289.11	194.39	269.36	65.30	21.55	839.71	4.52	3.04	4.21	1.02	0.34	13.13
MAY	378.24	259.19	310.73	73.95	24.78	1046.89	5.22	3.58	4.29	1.02	0.34	14.45
JUNE	410.43	263.45	310.73	76.82	24.78	1086.21	5.45	3.50	4.13	1.02	0.33	14.43
JULY	328.50	184.60	260.65	69.83	21.01	864.59	4.80	2.70	3.81	1.02	0.31	12.64
AUGUST	335.16	219.53	306.37	79.14	24.51	964.71	4.32	2.83	3.95	1.02	0.32	12.44
SEPTEMBER	363.72	217.83	311.31	78.35	27.20	998.41	4.74	2.84	4.05	1.02	0.35	13.00
OCTOBER	346.94	199.07	263.97	67.33	23.16	900.47	5.26	3.02	4.00	1.02	0.35	13.65
NOVEMBER	408.65	220.82	303.97	71.31	26.67	1031.42	5.85	3.16	4.35	1.02	0.38	14.76
DECEMBER	345.58	197.36	288.21	68.64	23.16	922.95	5.14	2.93	4.28	1.02	0.34	13.71
TOTAL	3659.43	2256.35	3277.07	841.68	269.34	10303.87	52.40	32.20	47.40	12.24	3.89	148.13
AVERAGE PER MONTH	307.95	188.02	273.09	70.14	22.44	858.66	4.37	2.68	3.95	1.02	0.32	12.34

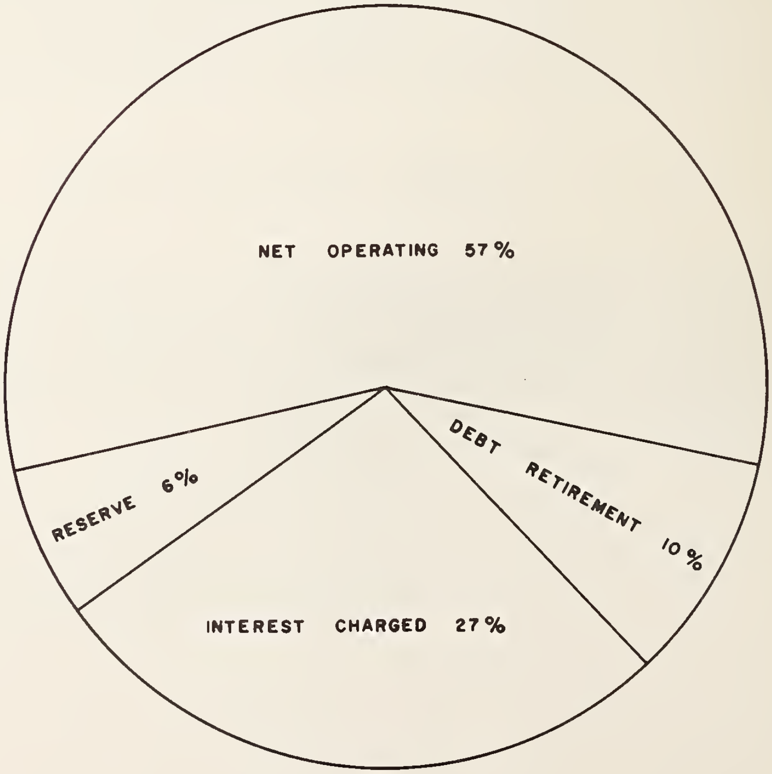
COMMENTS

The cost per ton of dry solids compares favourably with the previous year. The cost for ferric chloride and lime increased considerably due to the nature of the sludge. Labour and maintenance costs per ton of dry solids are lower than the previous year due to a greater quantity of sludge filtered. Total maintenance costs for 1966 were lower than in the previous year since major repairs were undertaken in 1965.

1966 OPERATING COSTS



TOTAL ANNUAL COST

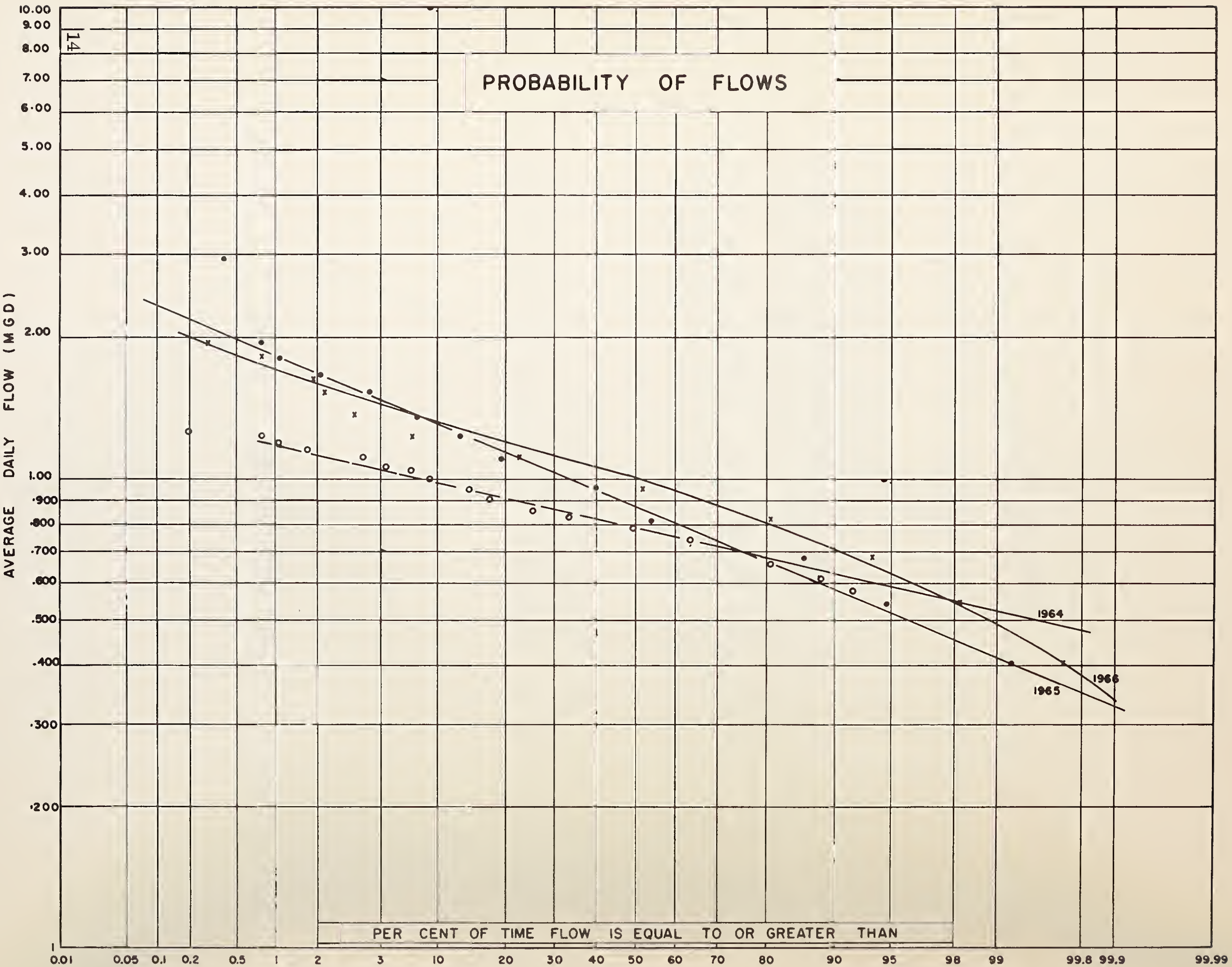


Process Data

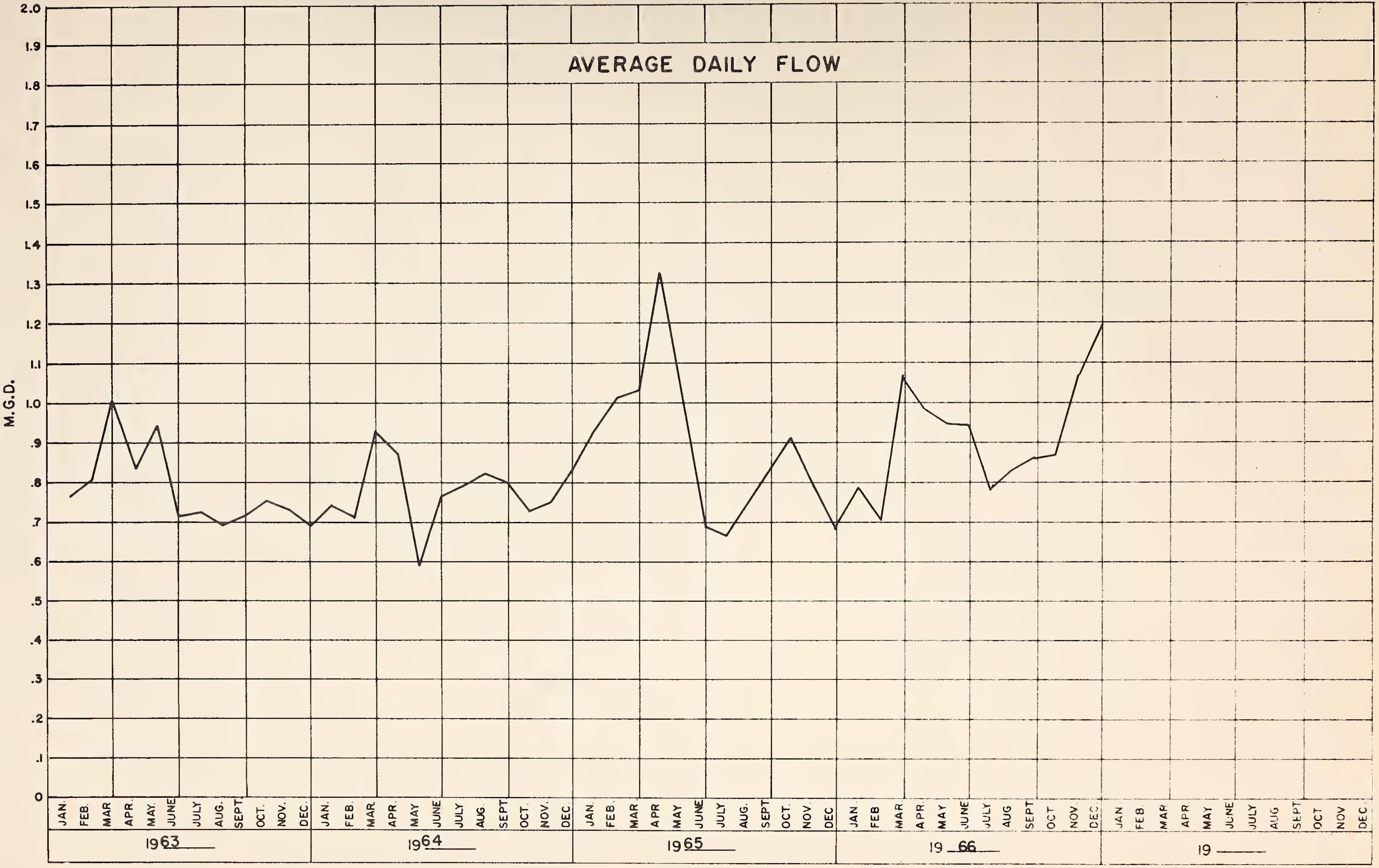
The average daily flow during the year was 0.923 million gallons, 51.3% of the design flow of 1.8 mgd. The design flow was exceeded less than 1% of the time.

From the average daily flow and average BOD and suspended solids concentration of 456 ppm and 585 ppm, respectively, in the raw sewage, it can be shown that the organic loading for BOD was 78% of the design organic loading and for suspended solids, 86% of the design value. The design value of 300 ppm for BOD concentration was exceeded 96% of the time. The design value of 350 ppm for suspended solids concentration was exceeded 88% of the time.

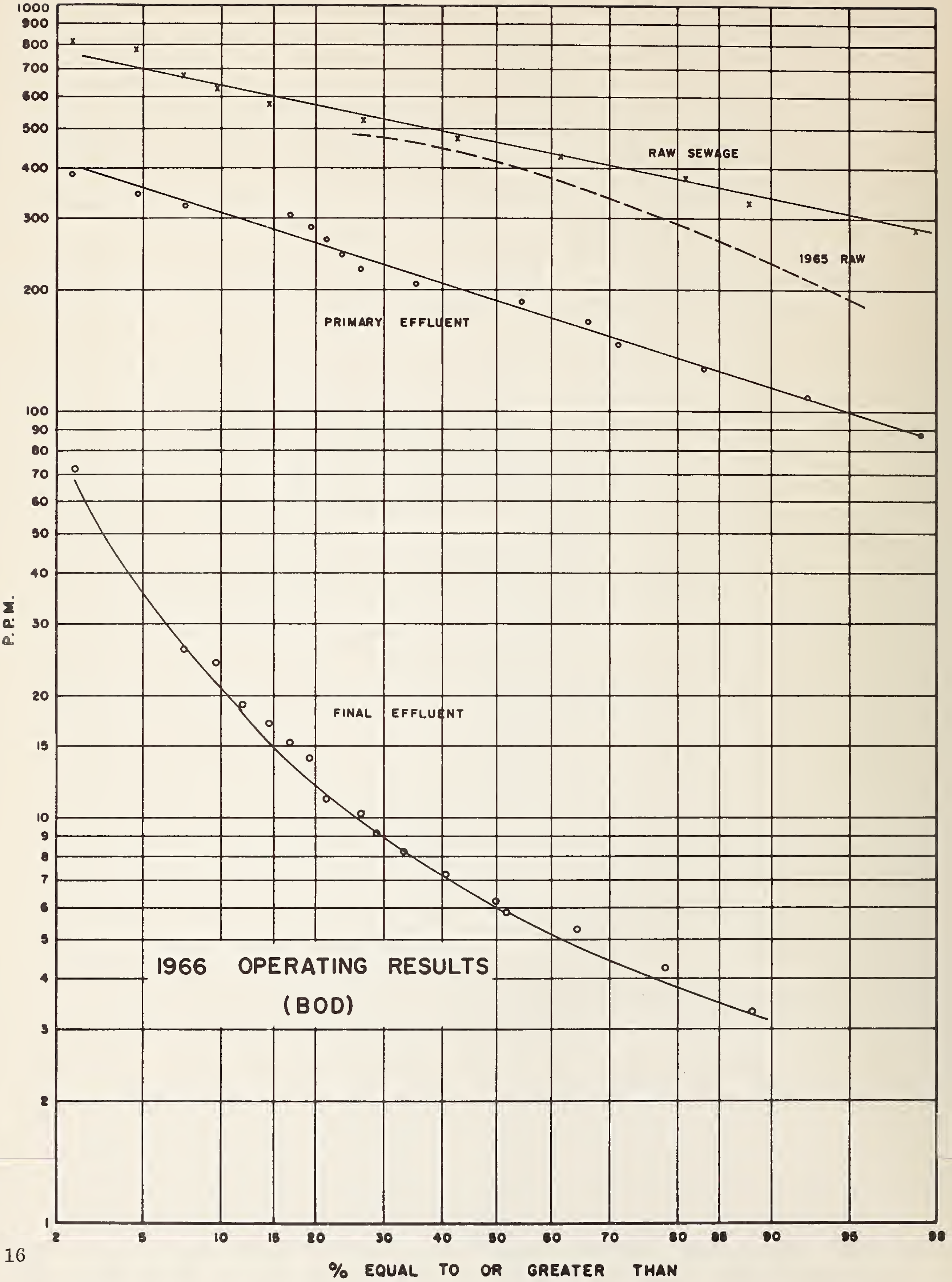
The OWRC objectives of 15 ppm for BOD and suspended solids were exceeded 15% of the time. The average effluent BOD and suspended solids concentrations during the year were 11 ppm and 10 ppm respectively.



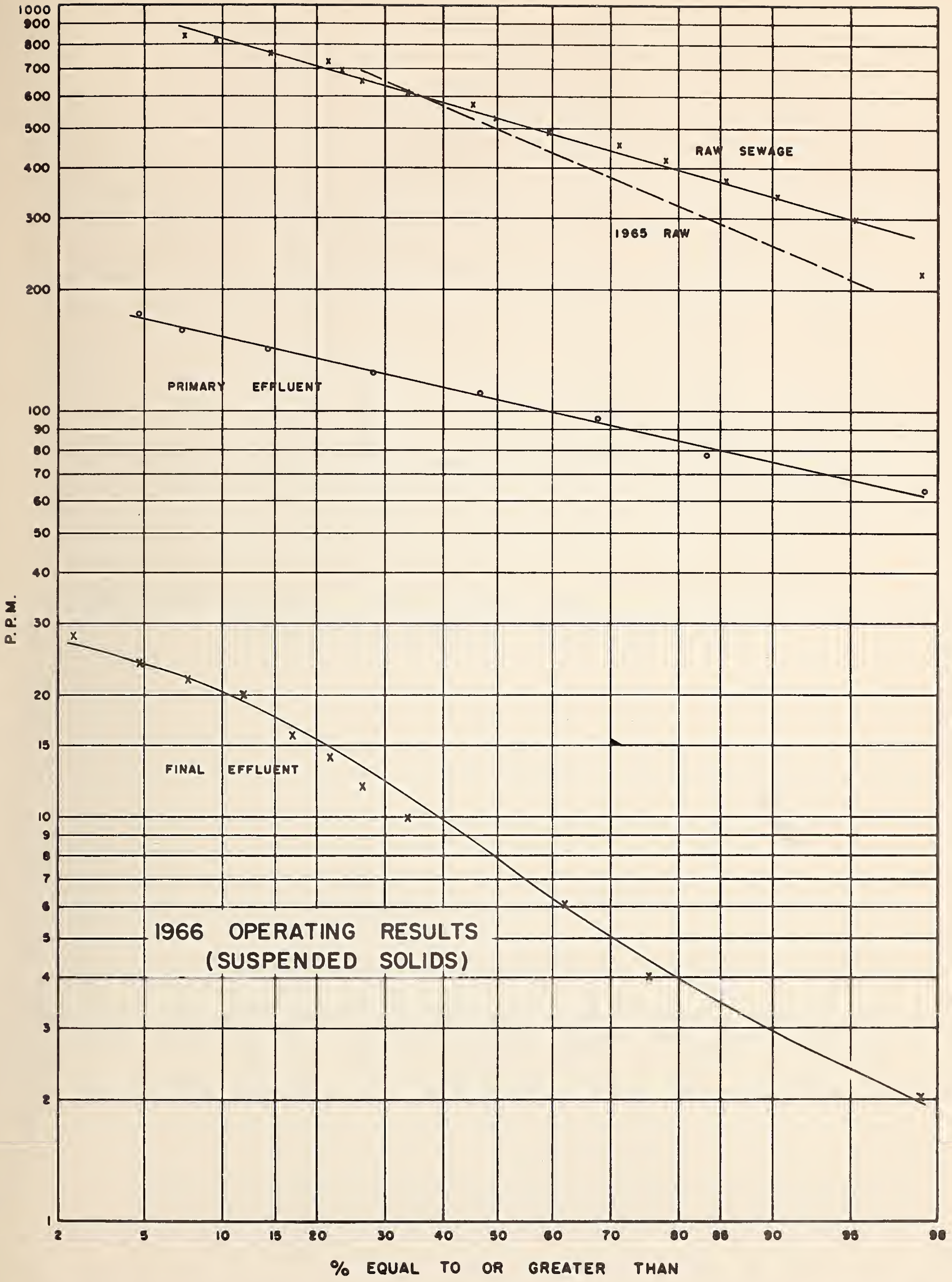
PROBABILITY OF FLOWS

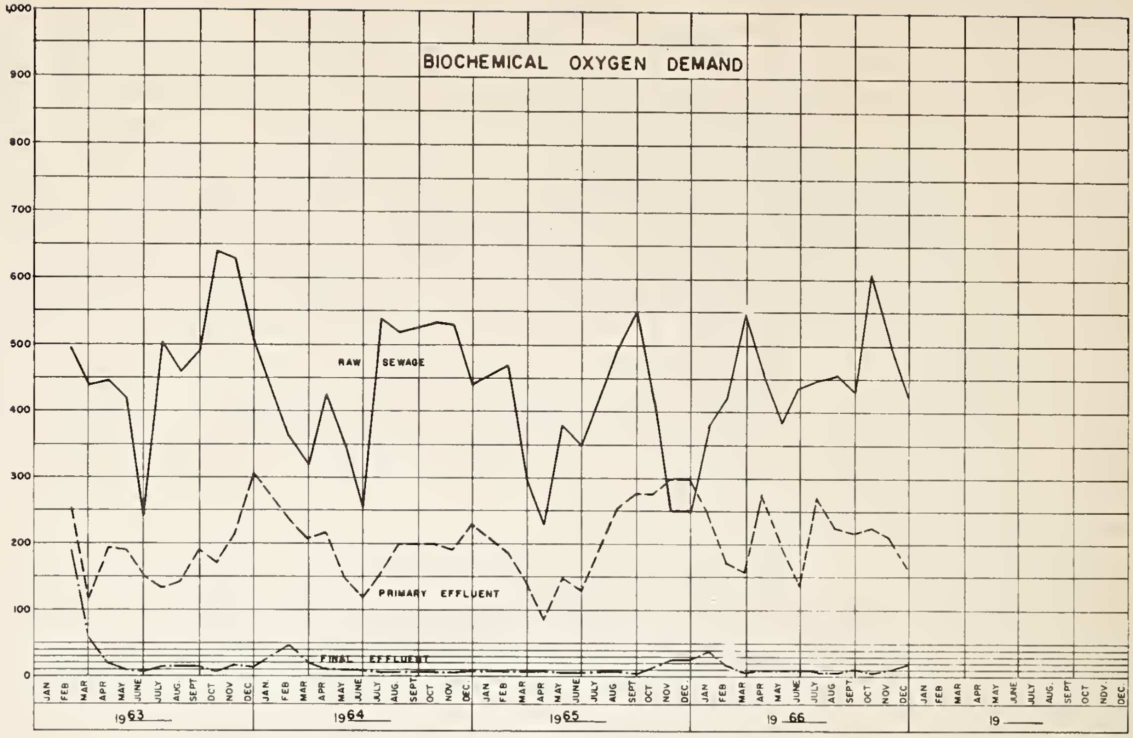


AVERAGE DAILY FLOW

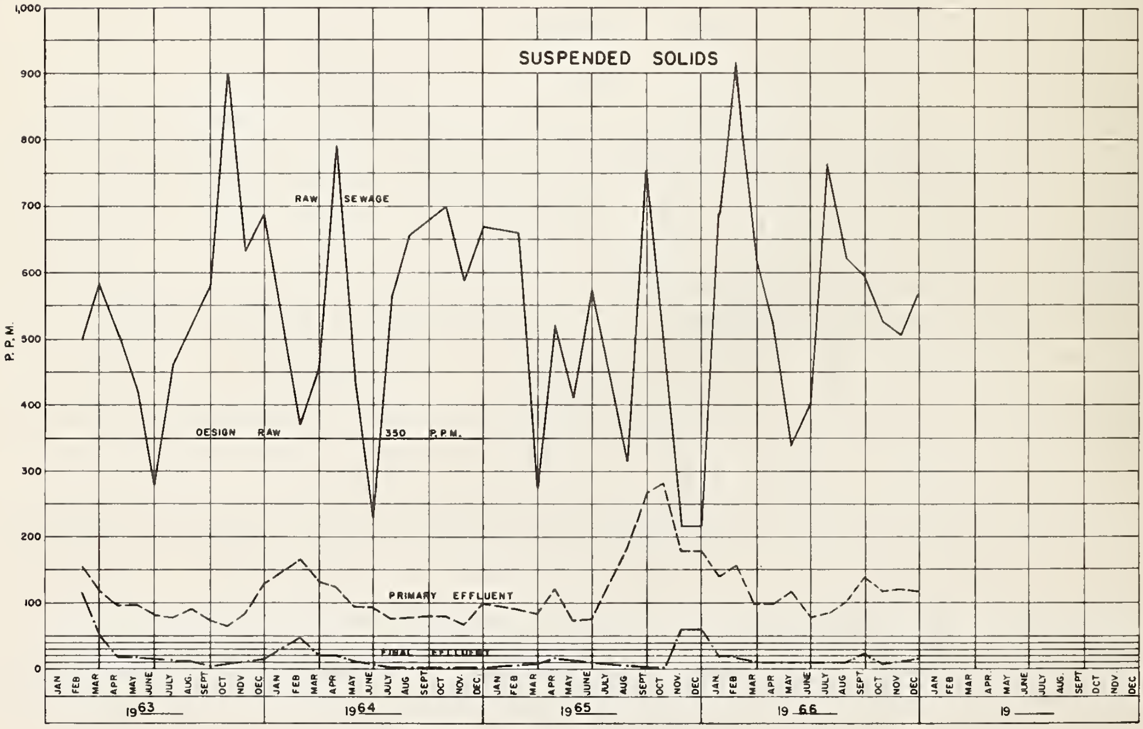


1966 OPERATING RESULTS (BOD)


1966 OPERATING RESULTS
(SUSPENDED SOLIDS)



MONTHLY VARIATIONS



GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	
JAN.	378	36	90.5	41.8	671	18	97.5	79.8	12
FEB.	420	13	97.0	40.6	917	16	98.0	89.9	14
MAR.	547	5	99.0	90.0	612	8	98.5	100.3	19
APR.	453	6	98.5	65.8	525	9	98.5	76.0	14
MAY	382	8	98.0	55.1	331	8	97.5	47.6	16
JUNE	438	9	98.0	61.3	399	5	98.5	56.3	12
JULY	450	6	98.5	53.9	765	4	99.5	92.4	14
AUG.	457	4	99.0	58.6	619	5	99.0	79.4	16
SEPT.	431	9	98.0	54.7	591	20	96.5	74.0	14
OCT.	609	4	99.5	82.0	522	5	99.0	70.1	7
NOV.	495	8	98.5	77.9	501	7	98.5	79.0	16
DEC.	418	19	95.5	73.2	567	12	98.0	101.8	-
TOTAL	-	-	-	749.7	-	-	-	968.7	154
AVG.	456	11	97.5	62.5	585	10	98.0	80.7	13

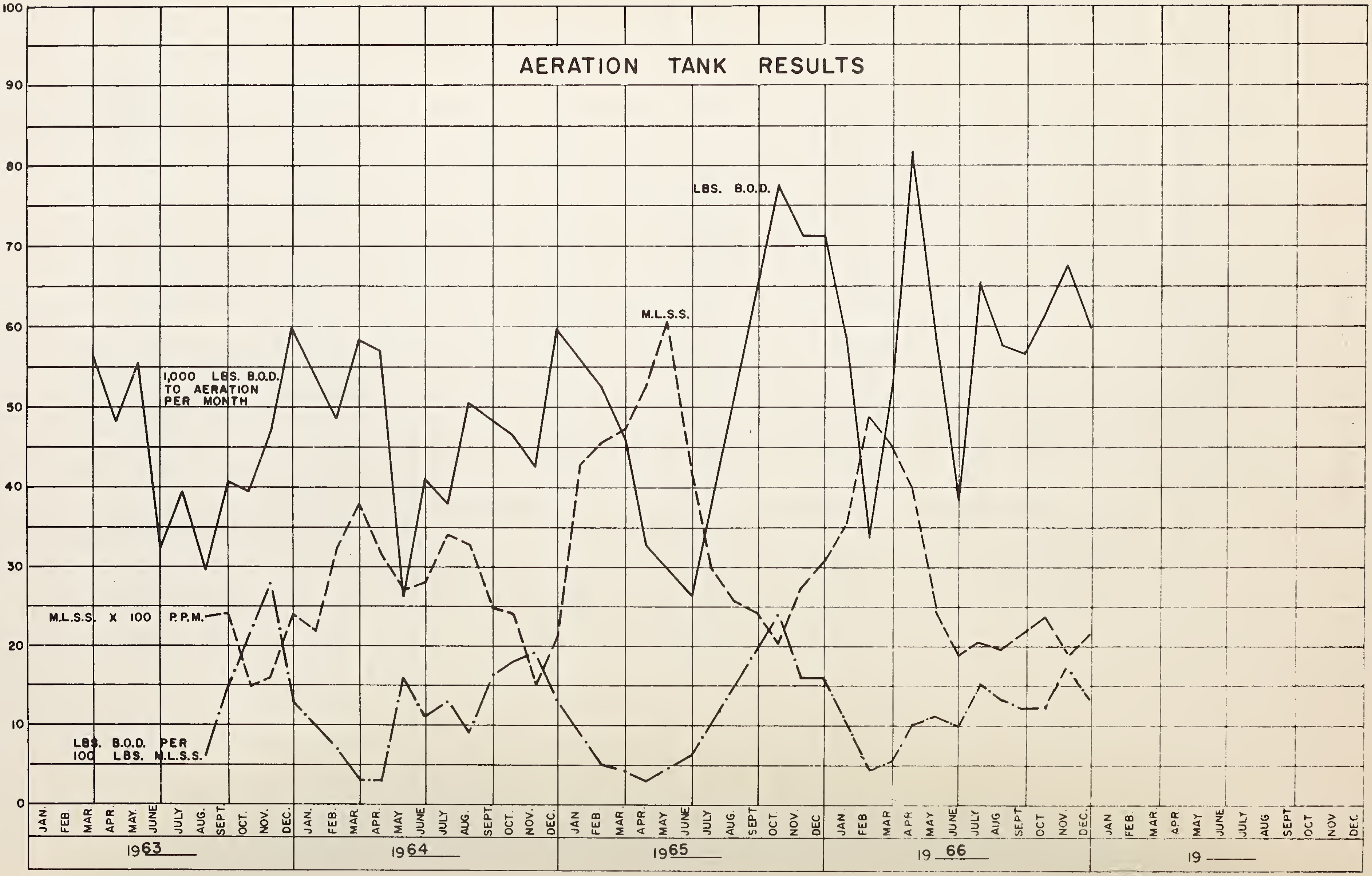
COMMENTS

The average percent reduction of 97.5% for BOD and 98.0% for suspended solids (above) is considered to be excellent treatment.

The average raw sewage BOD and suspended solids concentrations of 456 and 585 ppm respectively represent heavy organic loads and the effective reduction experienced at the plant can be attributed to excellent control and plant operation. This fact is reflected in the average final effluent BOD and suspended solids concentrations of 11 and 10 ppm respectively which were below the OWRC objective of 15 ppm.

During the year approximately 154 cubic feet of grit were removed from the sewage.

AERATION TANK RESULTS



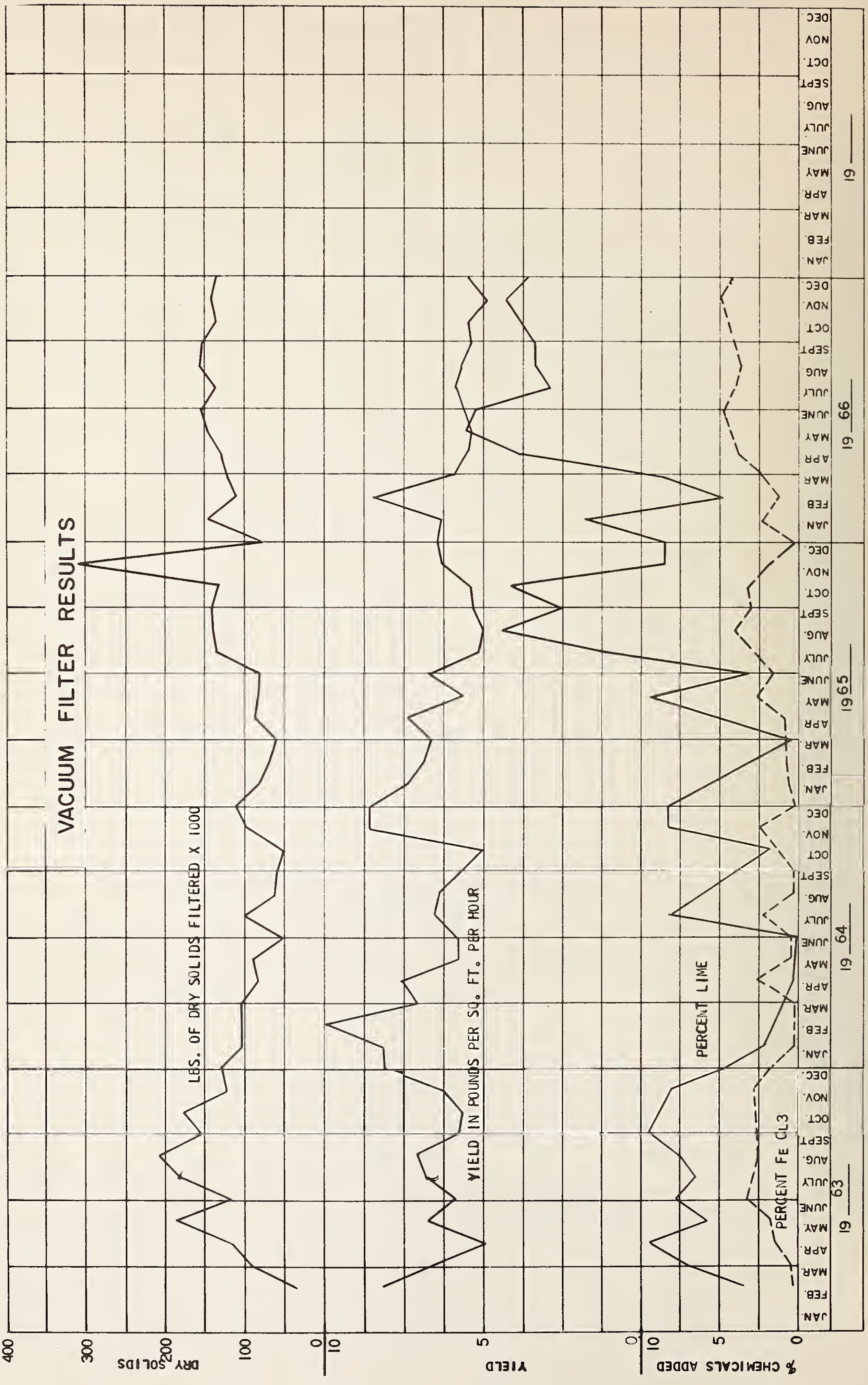
AERATION SECTION

MONTH	PRIM. EFFL. B.O.D. P.P.M.	M.L.S.S. P.P.M.	LBS. B.O.D. PER 100 LBS. M. L. S. S.
JANUARY	241	3516	10
FEBRUARY	170	4847	4
MARCH	157	4501	5
APRIL	278	3913	10
MAY	198	2412	11
JUNE	133	1838	10
JULY	272	2012	15
AUGUST	223	1998	13
SEPTEMBER	218	2162	12
OCTOBER	226	2388	12
NOVEMBER	210	1879	17
DECEMBER	162	2115	13
TOTAL	-	-	-
AVERAGE	207	2798	11

COMMENTS

With the higher organic loadings experienced at the plant during the year, it became impractical to operate an extended aeration process. The average loading ratio of 11 pounds of BOD per 100 pounds of MLSS is in the low range of the accepted loading limits.

Since a mechanical aeration system is utilized at the plant, no figures are available for the amount of air supplied.


VACUUM FILTER RESULTS
LBS. OF DRY SOLIDS FILTERED x 1000
YIELD IN POUNDS PER SQ. FT. PER HOUR
PERCENT LIME
PERCENT Fe CL3
DRY SOLIDS
400
300
200
100
0
YIELD
10
5
0
% CHEMICALS ADDED
10
5
0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
19 63
19 64
1965
19 66
19

VACUUM FILTER OPERATION

MONTH	FILTER HOURS		% SOLIDS DIGEST SLUDGE	LBS. DRY SOLIDS FILTERED	* LBS. LIME	% LIME	LBS. $FeCl_3$	% $FeCl_3$	% SOLIDS FILTERED SLUDGE	YIELD PSF/HOUR
	#1	#2								
JAN.	91.75	-	7.9	144780	13790	9.5	3449	2.4	25.0	6.3
FEB.	52.50	-	8.8	109787	3675	3.3	1534	1.4	28.0	8.4
MAR.	82.00	-	6.2	119967	7175	6.0	2632	2.2	25.0	5.9
APR.	92.75	-	6.3	128038	15960	12.5	4859	3.8	21.0	5.5
MAY.	107.00	-	6.0	144995	21230	14.7	6357	4.4	21.0	5.4
JUNE	107.00	-	6.4	150628	21630	14.4	6898	4.6	21.0	5.6
JULY	89.75	-	6.1	136930	15155	11.1	5521	4.0	23.0	6.1
AUG.	105.50	-	6.0	155189	18025	11.6	5633	3.6	22.0	5.9
SEPT.	116.75	-	5.3	153630	17885	11.6	6113	4.0	22.0	5.3
OCT.	99.00	-	5.6	132029	16345	12.4	5831	4.4	20.0	5.4
NOV.	114.00	-	5.1	139823	18130	13.0	6868	4.9	19.0	4.9
DEC.	99.25	-	6.3	134585	16205	12.0	5808	4.3	20.0	5.4
TOTAL	1157.25	-	-	1620381	185255	-	61503	-	-	-
AVG.	96.44	-	6.3	135032	15437	11.4	5125	3.8	22.2	5.8

* LIME IS EXPRESSED AS 100% CAO

COMMENTS

The operation of a conventional aeration system produces a large quantity of sludge. This is reflected in the increased hours of operation, 1157.25 hours in 1966 compared to 716.55 hours in 1965, larger chemical dosages and lower yields.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (P.P.M)
JANUARY	24.455	1280	5.23
FEBRUARY	19.961	1284	6.43
MARCH	33.225	1348	4.06
APRIL	29.445	1570	5.33
MAY	29.453	1514	5.14
JUNE	28.583	1560	5.46
JULY	24.276	1656	6.82
AUGUST	25.861	1548	5.98
SEPTEMBER	25.915	1436	5.54
OCTOBER	27.103	1635	6.03
NOVEMBER	31.987	1520	4.75
DECEMBER	36.683	1972	5.38
TOTAL	336.947	18323	-
AVERAGE	28.079	1527	5.44

COMMENTS

An average dosage rate of 5.44 ppm was sufficient to maintain a chlorine residual of 0.5 ppm during 1966.

CONCLUSIONS

The foregoing data have illustrated that, although the plant received heavy organic loadings, during the year efficient treatment was obtained due to the efforts of the plant staff who worked closely with the head office staff of the Division of Plant Operations.

RECOMMENDATIONS

Though the hydraulic loading is well below the design value, the organic loading is approaching the design figures. Industrial wastes contributing to the high organic loading should be controlled to extend the life of the existing facilities.

ONTARIO WATER RESOURCES COMMISSION